

## **The autosegmental distinction of tonal language types: with specific reference to Chilcotin tone phenomena**

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A distinction has been drawn in phonology between two types of languages which exhibit tone phenomena. Languages are traditionally categorized as pitch accent or tone languages. Proponents of autosegmental phonology have captured these categories or language types by employing a separate method of tone association for each. Chilcotin is an Athaspaskan, language, spoken in the mid-interior region of British Columbia. It exhibits tone phenomena, although whether it belongs to the category of pitch accent languages or to the category of tone languages is debatable. In the course of this paper, some of the traditional features of these two types of tone phenomena will be examined in an attempt to categorize, accordingly, the Chilcotin language. The ability of autosegmental phonology to accurately account for the data provided by Chilcotin, will then be evaluated.

The behavior of tone in tone languages is similar to the behavior of most segmental features, in that it is phonemic. Most syllables of most words are associated with a tone of some sort in the lexicon, (sometimes enclitics or unstressed morphemes are excepted), and can be contrasted with other syllables or words associated with another tone. These tones are usually subject to sequential constraints. They can be affected by the segments to which they are assigned, or the neighboring segments, and they generally undergo such phonological processes as tone assimilation and dissimilation. Generally, there are more than two pitch levels involved in the tone behavior of tone languages, (Hyman 1975).

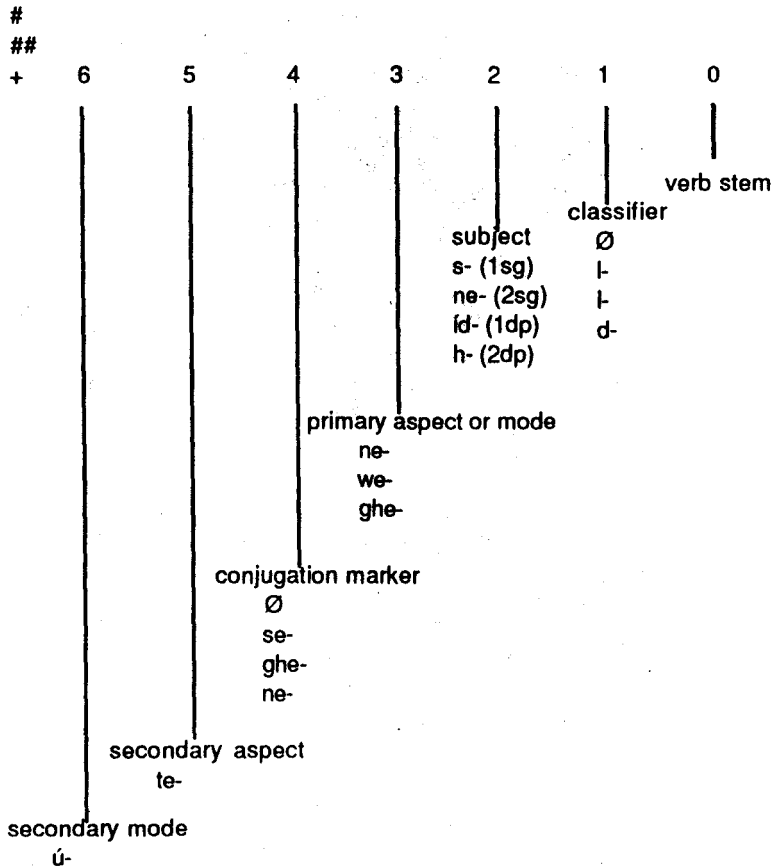
Pitch accent languages, on the other hand, generally use a given pitch, (or tone), to indicate prominence of a given syllable within a word. Tone is used in a prosodic function in pitch accent languages. Only one prominent tone or marked tone is associated with each word, and although it does occur, tonal contrast is not a fundamental part of pitch accent languages. Not every pitch accent language marks the prominent tone in the lexicon. It may be assigned by a phonological rule, in which case the surface realization should be regular for all words, (eg. always on the penultimate syllable). If the prominent tone is marked in the lexicon, usually it is because it cannot be predicted by a phonological rule. Tones in pitch accent languages do not tend to undergo the phonological processes of tone assimilation and dissimilation, and indeed the presence or absence of tone in pitch accent languages can be said to influence segmental changes. Finally, pitch accent languages generally only associate one pitch level or tone with primary prominence, and possibly another with secondary prominence. Further distinctions of pitch level are not common in pitch accent languages, (Hyman 1975).

Before examining the tone processes of Chilcotin, some preliminary comments on morphology and phonology of the language, are necessary. First, the tone processes of Chilcotin which will be examined here are only those involved in the verb morphology

of the language. Although the processes are morphophonemic, it is assumed that they are characteristic of other tone processes in other areas of Chilcotin morphology.

All the data and information about Chilcotin, provided here, are taken from Cook, (1989). According to this article, Chilcotin is a prefixing language, with an extensive verbal morphology. The relative positions of the verb stem and its prefixes are illustrated in diagram 1.1 below.

Diagram 1.1  
Chilcotin Verbal Prefix Positions



Since it is not the purpose of this paper to provide an exhaustive description of the phonological processes that occur in Chilcotin, some of the processes referred to in Cook, (1989), will not be mentioned here. Those that will be mentioned are intended to provide the mechanisms necessary to understand the changes which occur between the

phonemic level and the phonetic level in the data which will be provided later. With this in mind the following phonological processes are listed in order so that a bleeding and / or feeding order is indicated.

### 1. Epenthesis

When the prefix following a disjunct boundary, (##), is not syllabic, epenthetic [h-] is added after the boundary. When the prefix is only a vowel, epenthetic [h-] is added. Only the second phenomenon will be encountered in the data examined here. This process is illustrated in the following word:

a) /- ú - ne - s - d - yan/ --> [húnesjãn]  
 mod - perf - 1sg - cl - shy  
 'I am shy'

### 2. Metathesis and Tensing

ne- (2sg, subject prefix), ne- (perfective prefix) and ðe- (conjugation marker), become metathesized when they are in an internal position in the verb prefix complex, as illustrated by the following word:

b) /ne - ne - bin/ --> /ne - en - bin/  
 perf - 2sg - swim perf - 2sg - swim  
 'You swam'

As a result, the vowel /e/ of these prefixes may come into contact with a preceding /e/ as it does in the above example. This triggers a tensing rule which states that if the boundary between the two vowels is the + conjunct boundary, they collapse into a single [e], or if the boundary between the two vowels is the - conjunct boundary, they collapse into the vowel [i]. In the case of the example above the boundary is the - conjunct boundary and thus the vowels collapse into [i]:

c) /ne - en - bin/ --> [nĩmbĩn]  
 perf - 2sg - swim  
 'You swam'

### 3. Nasal Assimilation

A nasal consonant becomes co-articulated with the following stop consonant. This was seen in example c) above, where, after metathesis the /n/ of the 2sg morpheme /ne/, becomes assimilated in point of articulation with the /b/ which it precedes, making it a bilabial nasal or [m]. The example from c) is repeated in d) below:

d) /ne - en - bin/ --> [nĩmbĩn]  
 perf - 2sg - swim  
 'You swam'

#### 4. Lax Vowel Deletion

A lax vowel is deleted when it comes into hiatus with a tense vowel.<sup>1</sup>

- e) /ne - ne - íd - qa/ --> [nèníqà]  
 p4 prefix<sup>2</sup> - perf - 12sg - sew  
 'you and I sewed'

#### 5. D - effect

/d/ is either deleted before a stop or an affricate (f), or else it combines with a continuant to form an affricate (g).

##### d-deletion

- f) /ne - íd - bin/ --> [níbín]  
 perf - #12 - swim  
 'you and I swam'

##### d-affrication

- g) /ú - ne - s - d - yan/ --> [húnésjàn]  
 mod - perf - 1sg - cl<sup>3</sup> - shy  
 'I am shy'

There are two level tones in Chilcotin; high (H) and low (L). Low tone is considered to be the default tone, while high tone is considered to be marked in the lexicon. There are two different types of behavior associated with the marked high tone in Chilcotin verb paradigms specifically. One marked high tone spreads to the right, causing tone assimilation in all of the following syllables. This process is blocked in syllables where the coda is a nasal consonant, but it is promoted in syllables where the onset is a tense (fortis) consonant, and the nucleus is a high front vowel, regardless of the coda. The second marked high tone is associated only with the first person duo-plural, (12), subject prefix, 'íd-'. This high tone causes a reversal of the tonal value of the vowel in the syllable immediately to its right, which is the vowel of the verb stem. That is, if the stem tone is low underlyingly, it becomes high after the 12 subject prefix; if it is high underlyingly, it becomes low after the 12 subject prefix. This second process appears to occur even when the vowel of the 12 subject prefix, which was originally

<sup>1</sup>With the intent of accounting for regular correspondences of the vowel phonemes, Cook (1989: 148), has drawn the following tense/lax vowel contrasts for Chilcotin:

Tense: i, u, a

Lax: -i, o, e

<sup>2</sup>p4 indicates prefix position 4 as indicated in diagram 1.1.

<sup>3</sup>cl indicates a classifier as indicated in diagram 1.1.

associated with the high tone, is deleted due to phonological processes. Finally, low tone is associated with any vowel which is not already associated with a tone. These processes are illustrated in the examples below.

#### High tone spreading

ná-; p2 prefixes; -bish, 'swim'(customary)

1	/ná#s-bish/	-->	násbìsh	
2	/ná#ne-bish/	-->	námíbìsh	
3	/ná#∅-bish/	-->	nábìsh	
12	/ná#íd-bish/	-->	nábìsh	
22	/ná#h-bish/	-->	náhbìsh	
33	/ná#je+∅-bish/	-->	nájébìsh	(Cook 1989: 188)

#### Low tone reversal

ne-, p4; p2 prefixes; -bin, 'swim'(perfective)

1	/ne-i-bin/	-->	nìbìn	
2	/ne-ne-bin/	-->	nìmbìn	
3	/ne-in-bin/	-->	nìmbìn	
12	/ne-íd-bin/	-->	nìbìn	
22	/ne-h-bin/	-->	nèhbìn	
33	/je+ne-in-bin/	-->	jènìmbìn	(Cook 1989:184)

#### High tone reversal

ne-, p4; ne-, p3; p2 prefixes; -qâ, 'sew'(imperfective)

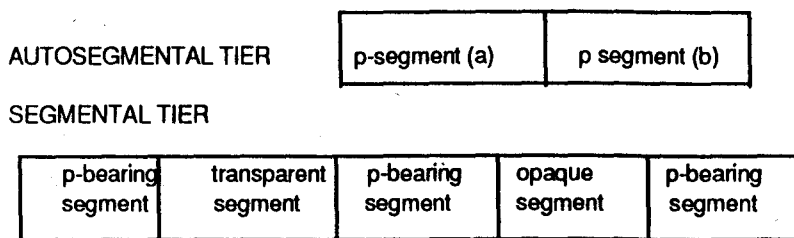
1	/ne-ne-s-qâ/	-->	nènèsqâ	
2	/ne-ne-ne-qa/	-->	nèninqâ	
3	/ne-ne-∅-qâ/	-->	nènèqâ	
12	/ne-ne-íd-qâ/	-->	nèninqâ	
22	/ne-ne-h-qâ/	-->	nènèhqâ	
33	/ne-je+ne-∅-qâ/	-->	nèjènèqâ	(Cook 1989: 184)

Before providing an autosegmental analysis of this data, a few of the assumptions made by proponents of the framework, must be addressed. First, in autosegmental phonology, an autosegment is said to be any phonological element, (p-

segment), which affects an entire word, and not just a segment. In structural phonology, an autosegment was often referred to as a suprasegmental feature. However, autosegments, in this case tone, can operate independently of the segmental structure of the word, as indicated in those cases where the vowel which carries the tone disappears, while the tone continues to have the same effect on the following vowel. Autosegments are associated with the segmental structure of a word by linking rules, which are constrained by a well-formedness condition. Segments which can be associated with or linked to a p-segment are called p-bearing units. Segments which are not associated with the p-segment, but which block its spreading process, are called opaque segments. Segments which are not associated with the autosegment, and which do not block its spreading process are called transparent segments. Diagram 1.2 below indicates the format of this type of a phonological analysis of 'suprasegmentals'.

Diagram 1.2

Sketch of Autosegmental Phonology

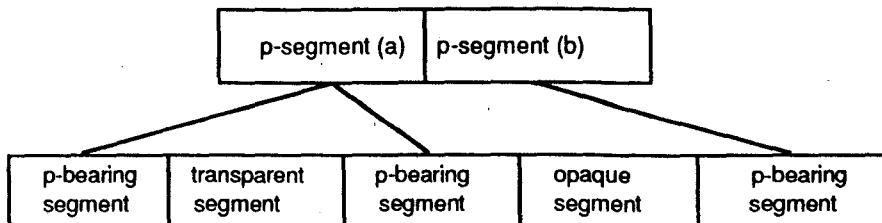


ASSOCIATION/LINKING RULES

- associate p-segment (a) to every p-bearing segment, beginning with the leftmost segment
- associate any unassociated p-bearing segments with p-segment (b)

WELL FORMEDNESS CONDITION

- association lines must not cross

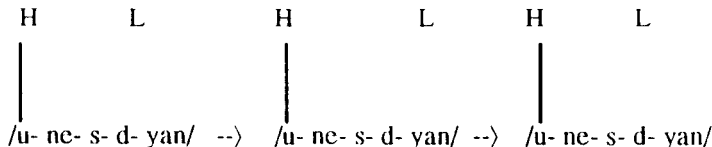


Association of p-segments and p-bearing segments does not have to be rule governed. There are instances when certain p-bearing segments are considered to be marked in the lexicon for a certain p-segment, and therefore do not come to be associated with that p-segment via a rule. This would include those pitch accent languages which do not appear to have a regular syllable upon which the primary prominent tone falls. In this case, any secondary p-segment, or tone, would be associated with other p-bearing segments using the pre-linked or lexically marked p-bearing segment as a point of reference. In the case of Chilcoltin, both tone phenomena, spreading and reversing, occur only in conjunction with specific morphemes, and are thus considered to be lexically marked. Therefore both of these lexical tones will be characterized as pre-linked in the autosegmental analysis. Any other analysis would require that conditioning factors for the variations in these tones be determined, and according to the data, there are none.

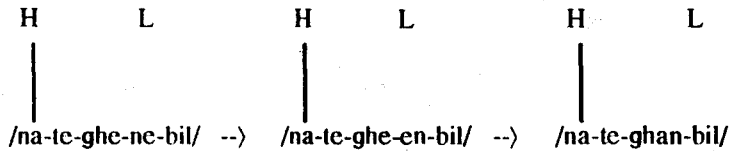
To continue with the Chilcoltin data, an autosegmental analysis for the two high tone processes will be given separately, as the two processes appear to operate quite independently. First, the spreading high tone can be formalized as follows:

1. p-segment = high tone (H)  
 p-bearing unit = most vowels  
 opaque segments = any vowel in a syllable with a nasal coda  
 transparent segments = all consonants  
 domain = at least the phonological word  
 rule = associate L to every vowel which is not already associated with a tone and then associate H with every vowel to the right of the prelinked H, disassociating the original tones.

- (i) ú, p6; ne-, p3; s-, p2; d-, p1; -yan, 'be shy'  
 /ú-ne-s-d-yan/ --> [húnésjàn]



- (ii) ná#, te-, p5; ghe-, p4; ne-, p2; -bil, 'swim'  
 /ná-te-ghe-ne-bil/ --> [nátéghàmbĩl]

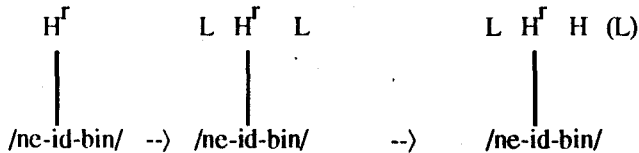


In the examples given here the high spreading process is blocked by the syllables with nasal codas which leaves the remaining part of the two words with the default tone L. As the second example indicates, in order to achieve the correct surface form of the verb, this high tone spreading process must apply after the phonological rule of metathesis and tensing. Otherwise there would be no nasal coda in the second to last syllable, which is what ultimately halts the spreading process here. This indicates that the process of high tone spreading is quite closely linked to the surface form of the word, and is probably more akin to a phonological process than it is to a morphophonological process.

Next, the high tone which causes tone reversal on the following vowel can be schematized as follows:

2. p-segment = high reversing tone ( $H^f$ )
- p-bearing unit = most vowels
- opaque segments = high tone marked high, front vowels in syllables with a fortis onset.
- transparent segments = all consonants
- domain = one syllable
- rule = associate L with every unassociated vowel and then associate the prelinked  $H^f$  tone with the vowel in the following syllable, effecting a reversal of its original tone value.

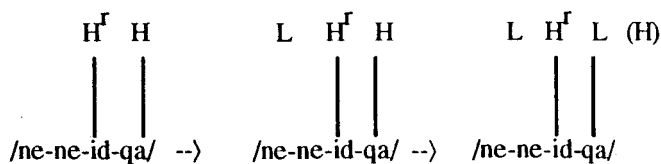
- (i) ne-, p4; íd-, p2; -bin, 'swim' (Cook 1989: 184)  
 /ne-íd-bin/ --> [níbín]





(ii) ne-, p4; ne-, p3; íd-, p2; -qá, 'sew' (Cook 1989: 184)

/ne-ne-íd-qá/ --> [nèníqà]



There are exceptions to this tone reversal rule as Cook points out, however, they remain as yet to be completely accounted for. For the purpose of this paper, these exceptions are not pertinent. The important information to be gained from this autosegmental analysis of the Chilcotin tonal variations, is the linking conventions which must be used to adequately account for the data. In the case of Chilcotin, it appears that linking is most accurate when it is applied using the prelinked segment as a reference point.

With two independent tonal processes interacting in Chilcotin, it would be impossible to propose a consistent melody which might always be associated with a given segmental structure. An example of such a case is Goldsmith's analysis of English, (1976). Here only the H is marked in the lexicon, and M and L are always distributed to the left and right of H, respectively, using the H as a point of reference, (Hulst and Smith, 1982:16).

M H L

|

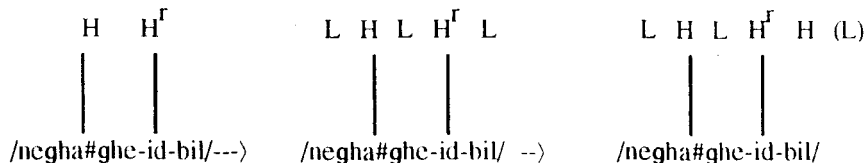
\*

archipelago

This cannot be done for Chilcotin because the possible combinations of tones are numerous, depending on the morphemes that are involved. It would still be necessary to indicate in the lexicon the two different high tones, H and H<sup>f</sup>, and their completely different behaviors. It would have to be determined whether one of these tone processes can predict the other, which appears not to be the case. These tones appear to operate in completely separate tiers. An autosegmental analysis of the two of processes affecting one word might be presented as follows:

neghá#, across; ghe-, p3; íd-, p2; -bil, 'swim'

/neghá#ghe-íd-bil/ --> [nèghághíbil] (Cook 1989: 189)



It is possible that the spreading high tone is the one that causes the final tone to become high, rather than the reversing high tone as diagrammed here. The two processes would affect the final vowel here in the same way, but which one affects it first, if indeed one process can be said to operate previous to the other, is indeterminable. It is evident, at least that these two processes operate quite independently, and as such result in quite successfully obscuring the underlying tone of the morphemes involved. So much tonal variation occurs on the surface in Chilcotin, that devising a tonal sequence for the words is virtually impossible and highly cumbersome.

According to Hulst and Smith, (1982), autosegmental phonology accounts for the differences between pitch accent languages and tone languages, by means of method of tone association employed. Pitch accent languages are said to have a single starred or prelinked syllable associated with a given pitch or tone, (usually H), around which secondary pitches are then associated with the remaining syllables in the word. This method was illustrated in the Chilcotin data and in the word "archipelago", given above, and it will be referred to here as the pre-linking association method.

Tone languages, on the other hand associate tones with tone bearers in a unidirectional, left to right, (or vice versa), fashion, mapping a lexically determined melody onto the segmental structure of the word. In tone languages, there is at least one tone per vowel, and the number of tones carried by a vowel can depend on the number of syllables in the word. The examples below are from the African language Etung, as described in Edmundson and Bendor-Samuel, (1966). The words given are of a class which follows one tone sequence or melody, (HHL):

'cloth'	'pepper'	'spear'	'sand'
H HL	H H L	H HL	H H L
/		/	
[efo]	[ngare]	[erop]	[esebe]

It has been indicated above that a representation like this one, for Chilcotin, would be next to impossible. Thus, according to the autosegmental definition of a tone language and a pitch accent language described by Hulst and Smith, (1982), Chilcotin must be considered a pitch accent language, since it utilizes the tone association method which is supposedly characteristic of pitch accent languages.

Returning to the descriptive definitions of pitch accent languages and tone languages given earlier in this paper, however, it seems that Chilcotin really does not exhibit the features of a pitch accent language. The high marked tones of Chilcotin do not appear to indicate the primary prominence of a given syllable within the phonological word, as marked tones of pitch accent languages are supposed to. Chilcotin words which do not contain the high marked spreading or high marked reversing tones show no tonal alternation. By default, every syllable is assigned a low tone, (unless segmental phonology results in the development of a specific tone phenomenon). This is not characteristic of pitch accent languages, in which one tone in every word is supposed to be marked with a primary prominent tone. It is clear from the data above that tone assimilation (spreading), and dissimilation (reversal), are intrinsic to the tonal variations

which occur in Chilcotin, while, in most pitch accent languages, tones do not tend to undergo these processes. Tones in pitch accent languages are supposed to condition segmental changes, not be subjected to segmental changes which occur.

Tone in Chilcotin, can be said to be lexical, as it is associated with only some morphemes in the lexicon, and based on these lexical tones, tonal assimilation or reversal may result. Therefore, based on the descriptive information available on Chilcotin, and on the descriptive distinctions drawn between tone languages and pitch accent languages, (Hyman 1975), a more accurate categorization of Chilcotin would be to call it a tone language and not a pitch accent language.

The distinction between languages which employ the unidirectional association method, and languages which employ the pre-linking association method, obviously, is an empirically interesting and important distinction. It may be merely a distinction between languages which have regular syllabic tone patterns and languages which have irregular tone patterns. Languages with irregular tone patterns would employ the pre-linking method of associating tones and segments, while languages with regular syllabic tone patterns would employ the unidirectional method of associating tones and segments. Languages with irregular tone patterns do not preclude tone languages, and languages with regular tone patterns do not preclude pitch accent languages.

In this paper a clear descriptive distinction was made between pitch accent languages and tone languages, and then the tone processes of the verb morphology of Chilcotin were analyzed, in order to provide insight into the tonal characteristics, of the language. With this information it was proposed that Chilcotin be analyzed within the autosegmental framework, using the pre-linking association conventions. It was later pointed out that proponents of autosegmental phonology have proposed that the difference between pitch accent languages and tone languages can be attributed to the association conventions commonly used to link tones to segments. Pitch accent languages were said to use pre-linking association conventions, while tone languages were said to use unidirectional association conventions. However, it was also recognized that although Chilcotin does use the prelinking association conventions, it actually exhibits the characteristics of a tone language. Thus, it has been concluded here that the autosegmental typology of languages according to their method of associating tone and segments, cannot be applied to the distinction between pitch accent and tone languages.

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